DOCUMENT RESUME

ED 140 263 CS 003 498

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TITLE	Consultation on a Basic Reading Skill: Hookena, 1975-76.
INSTITUTION	Kamehameha Schools, Honolulu, Hawaii. Kamehameha Early Education Project.
REPORT NO	TR-51
PUB DATE	76
NOTE	23p.
EDRS PRICE	MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS	Beginning Reading; *Consonants; Grade 1; Kindergarten; *Phonics; Primary Education; *Reading Instruction; Reading Readiness; *Reading Research; Reading Skills; *Small Group Instruction; *Teaching Techniques
IDENTIFIERS	Kamehameha Early Education Project

ABSTRACT

A small-group procedure for teaching consonant sounds was tested in two studies with rural kindergarten and first-grade students whose teachers had been trained to use the procedure by means of a videotape model and a live demonstration. In the first study, done at the end of the 1974-1975 school year, the kindergarten and first-grade participants knew about three-fourths of the sounds on a four-month follow-up test. In the second, better-controlled study, made at the beginning of the next school year, the kindergarten participants knew none of the sounds prior to the instructional phase of the study. On tests given immediately after training on each set of letters, they knew 80% of the sounds. On a follow-up test seven weeks later, they remembered about half of the sounds. Providing a tangible reinforcer for all-correct responses in a training session produced no differences in learning. Lower performance on follow up in the second study, compared to the first study, was attributed to the younger age of the participants. (Author/JM)

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Technical Report #51

Consultation on a Basic Reading Skill: Hookena 1975-76

Ramona H. Hao Kim C. M. Sloat

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CS 003 498

Technical Reports

of

The Kamehameha Early Education Program

a research and development program established and funded by

The Kamehameha Schools/Bernice P. Bishop Estate

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General Editors

Ellen Antill
Production Editor

The cooperation of the State of Hawaii Department of Education is gratefully acknowledged, as is the support and resources made available by the Sociobehavioral Research Group, MRRC, University of California, Los Angeles.

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Published by The Kamehameha Early Education Project, 1850 Makuakane Street, Honolulu, HI 96817

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The Kamehameha Early Education Program

The Kamehameha Early Education Program (KEEP) is a research and development program of The Kamehameha Schools/Bernice P. Bishop Estate. The mission of KEEP is the development, demonstration, and dissemination of methods for improving the education of Hawaiian and Part-Hawaiian children. These activities are conducted at the Ka Na'i Pono Research and Demonstration School, and in public classrooms in cooperation with the State Department of Education. KEEP projects and activities involve many aspects of the educational process, including teacher training, curriculum development, and child motivation, language, and cognition. More detailed descriptions of KEEP's history and operations are presented in Technical Reports #1-4.

Abstract

A small-group procedure for teaching consonant sounds was tested in two studies with rural kindergarten and first grade students. Their teachers were trained to use the procedure by means of a videotape model and a live demonstration. Teacher training was brief and effective, and the procedure was well received.

In the first study the kindergarten and first grade participants knew about three-fourths of the sounds on a four month follow-up test. In the second, better controlled study, the kindergarten participants knew none of the sounds prior to the study. On tests given immediately after training on each set of letters, they knew 80 percent of the sounds. On a follow-up test seven weeks later, they remembered about half of the sounds. Providing a tangible reinforcer for all-correct responses in a training session produced no differences in learning.

Lower performance on follow-up in the second study, compared to the first study, was attributed to younger age of the participants. The second study was run at the beginning of the school year, while the first was done at the end of the year.

Technical Report #51

Consultation on a Basic Reading Skill: Hookena 1975-76

Ramona H. Hao Kim C. M. Sloat

The fundamental aim of the Kamehameha Early Education Program (KEEP) is to disseminate to public school teachers curricula and teaching methods which are proven aids to effective learning. The two parts of the dissemination process are the content to be disseminated and the method of dissemination. A particular procedure might be effective with KEEP students but not make a substantial difference in any other setting. Hence, it is desirable to assess the effects of any curricular system or teaching strategy in various settings.

This report describes a consultation effort which focused on a basic reading skill--the learning of letter sounds (phoneme-grapheme correspondences). A procedure for teaching letter sounds, which previously had been tried at KEEP on an experimental basis, was introduced in one public school classroom. It was used for two separate groups of students, and both studies are reported here. The first level of analysis is the effectiveness of the technique itself in teaching letter sounds; the second is the effectiveness of the method used to train the teachers to use the procedure.

KEEP has been interested in the problems of both urban and rural schools. In the spring of 1973, Hookena Elementary on the Kona Coast was selected as the rural school with which KEEP would work in a consultant resource role. Hookena School was selected for the following reasons:

1. The high proportion of Hawaiian and part-Hawaiian students.

2. The geographic isolation of the community.
3. Reading scores in the lower quartile of state-administered standardized tests (SCAT and STEP).

The first year of the consultation, 1973 to 1974, was an exploratory period to assess the problems and potentials of a long-range relationship (see Technical Report #27). To summarize, one KEEP Educational Specialist acted as the primary consultant to Hookena. Since Hookena was KEEP's first long-term consultation and part of a larger consultation research endeavor, a problem-solving strategy was adopted. The consultant acted as a resource, aiding the teachers in the clarification of problems and the development and implementation of solutions. As problems were solved, other areas of concern were brought up.

Most of the effort involved restructuring the mathematics curriculum. Among other results of this intervention, there was a 100 percent increase in the number of math pages completed correctly in class. The consultant also worked with the teachers on motivating students, primarily with positive reinforcement techniques.

The relationship between the consultant and the school personnel during this initial year seemed to be a mutually productive one.

1974-1975 Consultation

In the fall of the 1974-75 school year, the KEEP consultant returned to Hookena three times to maintain the consultation relationship. Standardized tests were administered and data were collected. The Hookena teachers and school personnel were informed that no consultation program would be conducted in the first semester of this school year due to KEEP staff limitations. It was proposed that the relationship be reestablished during the second semester.

In February, 1975, the 1973-74 consultant was assigned to other duties at KEEP, and, consequently, another Educational Specialist was appointed the primary consultant to Hookena.

On March 7, the KEEP Coordinator and the new consultant made the initial contact with the Hookena teachers. Since all the teachers had enjoyed working with the previous consultant, at first there was some reluctance to change to another. They also expressed concern that KEEP had had no contact with them for some months. To facilitate the transition from one consultant to another, the first consultant made a trip to Hookena on March 11 to discuss previous results.

During this first contact, one teacher was absent, but the two teachers present agreed that the biggest problem confronting them, and others in the area, was reading. When the area of reading, which at Hookena consisted solely of HEP (the Hawaii English Program) was further explored, several points were raised:

1. A few children were reading very well (i.e., above grade level).
2. Many students had been in the early levels of HEP for months and were below grade level.
3. The teachers thought that the successful students were generalizing phoneme-grapheme correspondences from the sight words in the stacks, and that the unsuccessful students were not generalizing, and were not seeing patterns in the HEP stacks.

Both teachers agreed that they would be interested in working on the acquisition of phoneme-grapheme correspondences with the new consultant.

On March 18, the consultant returned to Hookena with the Coordinator. During a morning meeting, the third teacher in the team agreed that a project on the acquisition of these correspondences would be most beneficial.

An after school meeting was arranged to discuss the proposed technique. At this time, it was agreed that KEEP remunerate the Hookena teachers for the extra time and effort required for the study.

Since it had been anticipated that the third teacher would concur on a reading intervention, the KEEP consultant came prepared to introduce a particular approach to teaching grapheme-phoneme correspondences.

In addition to the potential benefits for the Hookena students, there were consultation-research aspects to the contemplated intervention for KEEP. These were:

1. Whether, with the aids of a discussion, a 10-minute videotape, and a consultant demonstration in the classroom, a teacher could follow successfully a teaching strategy that had been effective at Ka Na'i Pono.
2. Whether a teacher in a regular classroom could keep the same kind of daily data on the students' responses as was done at Ka Na'i Pono.
3. Whether positive reinforcement could be built into the teaching strategy so that a teacher would be able to use it with a minimum of training.
4. Whether teachers would accept, or even prefer, a program planned and prepared in the KEEP demonstration school to meet a specific problem.

Method

Consultation Procedure

After the preliminary discussion with all three teachers, the consultant explained the research done at KEEP which was the basis of the proposed method. She displayed the materials which would be used and showed a videotape (prepared especially for this consultation) of a KEEP teacher demonstrating

the procedure with some of her own students. Important aspects of this procedure, such as method of presentation of materials and reinforcement of student attention, were discussed.

The next morning, the KEEP consultant demonstrated the technique live, using eight kindergarten students and one first grade student.

At this point, the three teachers seemed enthusiastic and ready for the study to go into effect immediately. A group of eight kindergarteners, eight first graders, and one second grader was put together on the basis of the teachers' evaluation that these students did not know consonant phoneme-gapheme correspondences. Students judged by the teachers as knowing the consonant phoneme-grapheme correspondences became the Non-Study group.

The consultant left the first set of materials with the teachers, and they began the procedure the following day.

The KEEP consultant returned to Hookena several times. The first time she checked on the progress of the study and brought the materials for the remaining sets of letters. Some procedural changes were made at this time as a result of the teachers' observations. The second visit occurred after all three letter sets had been taught, about one month later. A posttest was administered at this time. On a third visit, the next fall, a follow-up test was given.

Experiment 1

Materials

Stimulus cards. 5" X 8" index cards with letters in black were prepared. There was one card for each letter for each child. There were three sets of five letters each, making a total of 15 cards for each subject. The letter sets were: m, g, o, s, t; p, b, r, f, h; and w, d, l, j, n.

Record sheets. These were 8 1/2" X 11" pages on which each student's responses for each letter in each session were recorded. One sheet for each set of letters was needed for each subject.

Procedure

The Non-Study children did their regular HEP program during all of the study. They received no special instruction on the consonant phoneme-grapheme correspondences.

The 17 study children were divided into two teaching groups. Group 1 was made up of eight first grade children and one second grade child. Group K was made up of eight kindergarten children. Each group was taught approximately 15 minutes with Group 1 beginning at 9:05 a.m., followed by Group K. One teacher taught both groups in exactly the same manner while other students in the K-3 team were supervised in HEP by the remaining two teachers.

Five letters were presented each session. The same five letters were taught for a total of ten sessions, then a new set of five letters was introduced. Each child had a chance to respond once to each of the five stimulus letters each session.

At the first session for a new group of letters, the teacher:

1. Held up one stimulus card at a time saying, "This is a ____ (sound of letter)." Then repeated, "This is a ____."
2. Had the students repeat the sound.
3. Continued 1 and 2 for the other four stimulus cards.

This training sequence was done only the first session a new set of letters was introduced.

After the initial part of the first session, the following technique was used. The five letters for each child were placed face down in a stack. Each of these cards had the child's name on the back for recording purposes.

Therefore, if there were nine students in the training group, there would be nine stacks of five cards each.

The five letters in each stack were randomly ordered so that a child would not have the letters presented in th. same order every session.

The teacher took the first letter from any stack, held it up so all could see, and said, "I'm going to call on someone to tell me the sound that goes with this letter." She scanned all the students and called on the child from whose stack the card came.

If the child's answer was correct, the teacher said, "Very good, that's ____." If the child's response was incorrect, the teacher said, "No, that's ____." If there was no response, the teacher simply said, "That's ____."

The teacher had been encouraged to praise children for attending to the task. After a child had responded, the teacher used a pencil to lightly mark on the back of the child's stimulus card a "+" for a correct answer, a "-" for an incorrect answer, and a "o" for no response. These responses were transferred to each child's record sheet after each session.

During the consultant's visit after completion of the first set of letters, the teachers had noted that Group K seemed to be more attentive and alert than Group 1. This was attributed to previous failure experiences by the older members of Group 1. Therefore, the following procedural changes were made.

1. When a student in either group achieved three perfect sessions in a row, he would be considered to have learned the phoneme-grapheme pairs and would not come to the sessions again until the next set of letters was introduced.
2. When the third set of letters was introduced, a tangible reward to students in Group 1 would be given for getting five out of five

responses correct in a session. These rewards would be color pages depicting a popular TV hero. (These were supplied by KEEP.)

Results

Student data - posttest. No pretest on the phoneme-grapheme correspondences had been given to the kindergarten and first grade students. Instead, teachers had evaluated the student's knowledge of these correspondences at the beginning of the study.

Those students in the study had been evaluated by their teachers as knowing none or almost none of the phoneme-grapheme pairs. The demonstration lesson also showed that none of the nine students used knew the sounds of any of the five letters presented during it.

The kindergarten and first grade students not in the study (the Non-Study Group) had been evaluated as having already demonstrated knowledge of letter-sound pairs before the Study Group began the training. Their knowledge of the phoneme-grapheme correspondences was subsequently confirmed by the posttest (see Table 1).

Table 1

Mean Number of Letter Sounds Correct on Posttest

	Group		
	K	1	Total
Study	10.0 (n=7)	12.57 (n=7)	11.29
Non-Study	12.8 (n=5)	12.0 (n=8)	12.31

The difference between K study and nonstudy was significant ($t=2.42$, $p<.05$)

At the end of the study, a posttest was given to all kindergarten and first grade students. The results of this posttest are shown in Table 1. Two subjects from Group 1 and one from Group K were absent the day of the posttest.

Another relevant measure is performance during the training. Table 2 shows the number of students achieving at least one perfect session, and the number of students achieving three perfect sessions in a row for the three groups of letters presented. By the third set of letters, 82.4 percent of the students were able to achieve three perfect sessions in a row.

Table 2

Number of Students Achieving 100 Percent Accuracy on the Correspondence Training

		Sets of Letters		
		Set 1	Set 2	Set 3
# Students achieving 1 perfect session	K (n=8)	8	7	8
	1 (n=9)	9	8	9
# Students achieving 3 consecutive perfect sessions	K (n=8)	4	2	7
	1 (n=9)	4	6	7

At the introduction of the third set of letters, as mentioned previously, a tangible reward of a color page was introduced to those students in Group 1 who achieved a perfect five out of five correct answers for a session; Group K did not receive this reward. Table 3 shows the mean number of correct responses for each letter set for Group 1 and for Group K on the posttest.

Table 3

Mean Correct Letter Sounds by Letter Set, Posttest

	Letter Set		
	A	B	C
K (n=7)	3.0	2.71	4.28
1 (n=7)	3.86	3.86	4.86*

*tangible reinforcer for perfect session

There was no significant difference between Groups K and 1 on any of the letter sets.

Students Results - Follow-up

Approximately four months after the posttest, all students were given a follow-up test. Table 4 shows the mean correct responses for both groups.

Table 4

Mean Correct Letter Sounds, Follow-Up Test

	Group		
	K	1	Total
Study	9.4 (n=5)	11.28 (n=7)	10.5
NonStudy	13.25 (n=4)	13.38 (n=8)	13.3

Comparing these results with Table 1 shows that the study group had fewer correct responses on the follow-up test than the posttest, while the Non-Study Group did better on the follow-up test. The difference between the K study and Non-Study Groups was significant (t=4.06, $p < .025$), as was the Total Study - Non-Study comparison (t=2.66, $p < .025$).

Table 5 shows the mean correct responses on each letter set for the two study groups.

Table 5

Mean Correct Letter Sounds by Letter Set, Follow-Up Test

	Letter Set		
	A	B	C
K (n=5)	3.4	3.6	2.4
1 (n=7)	4.0	3.71	3.57

Comparing Table 5 with Table 3, it is apparent that most of the decrease in total score from posttest to follow-up is a result of much lower scores on letter Set C. This, in turn, is a result of faulty design--there was only one posttest, given after training on Set C. This resulted in scores which were artificially inflated for Set C compared to Sets A and B (which were being tested four and two weeks after training, respectively).

In fact, scores increased from posttest to follow-up on letter Sets A and B for Group K, and letter Set A for Group 1.

Teacher Reception of the Study

The three teachers' reception of the study was good as judged by the following:

1. The three teachers asked that the same study begin again in September of the 1975-76 school year with the incoming kindergarten class.
2. They asked that the study continue with the same children who had participated in the 1974-75 study. Further work in using the phoneme-grapheme pairs they had learned was requested.
3. They requested that the same consultant return for the 1975-76 school year.
4. The teacher conducting the study had been given the choice of keeping daily response data for each student or not; she volunteered

to do so and did.

5. In evaluating the project, the teachers expressed approval of a preplanned program to fit their needs.

Discussion

Consultation procedure. The procedure used to train the teachers was very effective, as judged by direct observation by the consultant and student results. This kind of very specific, preplanned program was well received. The training was brief and relatively economical. It seems likely that other similar specific teaching strategies could be similarly communicated.

Effectiveness of teaching method. Evaluation of the procedure used for teaching letter sounds is not as easy. There was no pretest used, so actual amount of learning cannot be measured. Students were assigned to groups on the basis of global teacher evaluation. Comparison of the two study groups is difficult in that they were not equivalent. These problems limit the following discussion.

Both on the posttest and follow-up test, there was no significant difference between Group 1 and their non-study peers. Either there was no difference between the groups to begin with, or the procedure was effective in teaching them letter sounds.

Group K knew significantly fewer sounds than their non-study peers on both the posttest and follow-up test. In that there was no pretest, the procedure might be seen as a failure. However, the teachers had evaluated these students as knowing few or not sounds. On follow-up, they knew an average of nine of the 15 sounds. If the teachers' original assessment were correct, this represents a modest success, bearing in mind the relatively small amount of teaching involved.

Tangible reinforcers were introduced in letter Set C for Group 1 to overcome some perceived motivational problems. It is completely impossible to assess the effect of this intervention on the amount of learning that took place. Due to the timing of the posttest and the possible nonequivalency of the letter sets, it is not possible to compare the performance of Group 1 on Sets B and C. It also is not possible to compare Group 1 with Group K on Set C as the groups were not equivalent.

Experiment 2

Experiment 1 demonstrated that it was possible to train teachers in a public school setting to use a procedure tested at KEEP. It was not possible to completely assess the effectiveness of the teaching strategy itself however. The teachers involved thought it was of real value, and wanted to use it with the new class of kindergarten children. Therefore the study was repeated, with a somewhat different design, to better test its effectiveness.

Subjects

All children who were in the kindergarten class at Hookena School in September 1975 were the subjects.

Materials

The same materials were used as in Experiment 1, except there were cards for 20 letters.

Procedure

All subjects were administered a pretest by the KEEP consultant on 20 consonant sounds (all except X). They were then randomly assigned to two groups. Both groups received training on the first set of letter sounds (m, g, c, s, t) according to the original procedure used in

Experiment 1. Upon completion of this phase of training the KEEP consultant returned to Hookena and posttested all subjects. On the basis of posttest scores and performance during training subjects were reassigned into two equivalent groups. Training then proceeded on Letter Set B (p, b, r, f, h). The same procedure was employed, except that subjects in Group 1 received a tangible reinforcer (the same used in Experiment 1) for every session in which all of their responses were correct. A posttest was administered upon completion of this training. Training on Letter Sets C (w, d, l, j, n) and D (y, z, q, v, k) followed the same pattern, except that all subjects received the reinforcer for perfect sessions. Posttests for each Letter Set were administered upon completion of training for each set. A follow-up test covering all 20 sounds was administered approximately seven weeks following completion of training on all letters.

Results and Discussion

Pretest results on each letter set for both groups is shown in Table 6.

Table 6

Letter Sounds Correct on Pretest

	Letter Set			
	A	B	C	D
Group 1 (n=7)	.29	0	0	0
Group 2 (n=6)	0	0	0	0

It is obvious that the children did not know the sounds.

Results of the posttest on each letter set are shown in Table 7.

The same data are presented in Figure 1. There are no significant differences in performance between the groups or across letter sets.

Table 7

Letter Sounds Correct on Posttest

Group	Letter Set				Total
	A	B	C	C	
1 (n=7)	3.71	4.0*	3.43*	4.00*	15.14
2 (n=6)	3.83	3.87	4.12*	3.67*	15.29

* Tangible reinforcer for perfect session during training.

However, it should be noted that on Set B, the performance of Group 1 (which received tangible reinforcement) improved while that of Group 2 fell off (no reinforcement). On Set C (when both groups received tangible reinforcement) Group 2 improved compared to Sets A and B.

Both groups had just under four correct responses (out of five) on each letter set. On Set C, the mean for both groups was 3.8. In Experiment 1, the mean on Set C for Groups K and 1 combined was 4.3. The difference is not significant, however. (Group K in Experiment 1 was six months older.)

Results of the follow-up test are given in Table 8.

Table 8

Letter Sound Correct on Follow-Up Test

Group	Letter Set				Total
	A	B	C	D	
1 (n=6)	3.17	2.17*	2.17*	3.0 *	10.5
2 (n=6)	2.67	1.33	1.0 *	2.17*	7.17

*Tangible reinforcer for perfect session during training.

It is apparent that there is considerable drop-off in scores on the follow-up test compared to the posttests. On the posttests, administered immediately following completion of training on each letter set, students

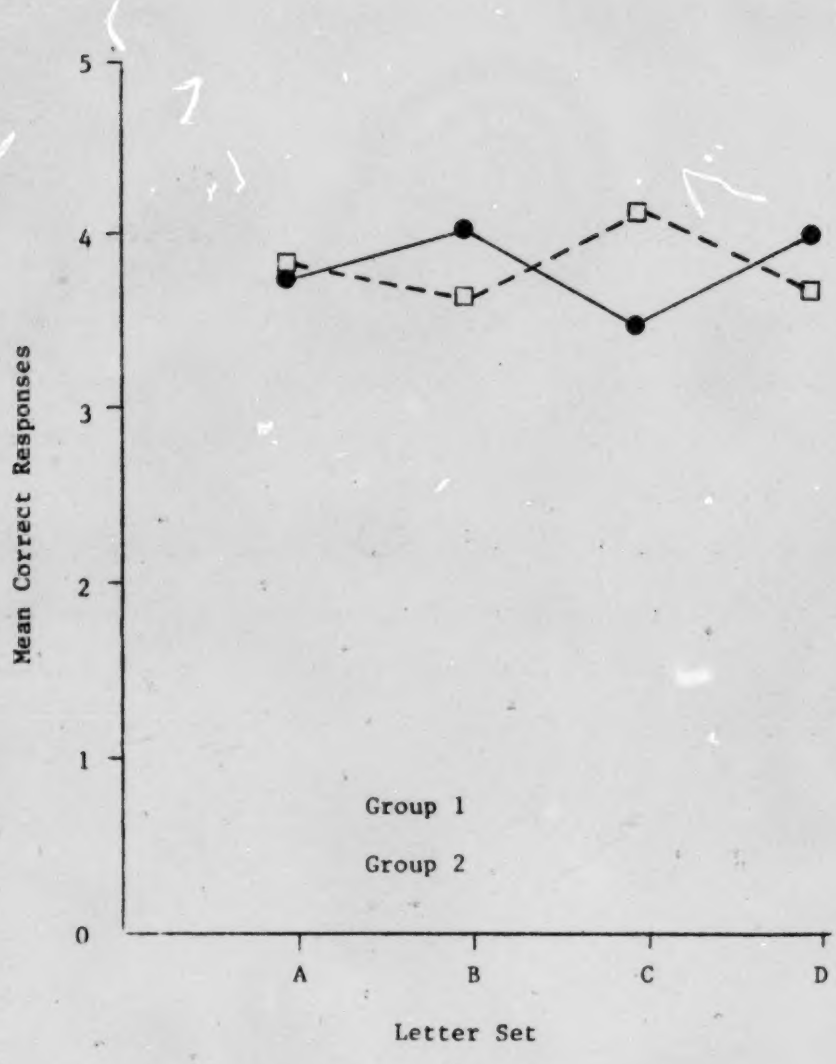

Figure 1. Mean correct letter sounds on posttests

in both groups knew about three-fourths of the letters. On the follow-up test, they knew half or fewer of the letters. By comparison, the K group in Experiment 1 knew about two-thirds of the letter sounds at follow-up testing.

Some decline in scores is to be expected from an immediate posttest to a delayed follow-up test. However, the decline in this case seems large, particularly in comparison to the results of Experiment 1.

There are several possible causes, for this. First, the subjects in Experiment 2 were younger than those in Experiment 1. Training in Experiment 2 began six months earlier in the school year than in Experiment 1, and the students had learned less retention skills. Also, since it was earlier in the year, the students were not yet into reading activities. Consequently, they had little or no opportunity to make use of what they learned during training. The subjects in Experiment 1, on the other hand, were already involved in reading activities and had daily opportunity and need to apply what they learned during training.

The results of the two studies suggests that this procedure for training grapheme-phoneme correspondences is more likely to be effective if used later in the kindergarten year. Also, the correspondences probably will be better retained if they are used in additional activities outside the training sessions.

General Discussion

The two studies reported in this paper were undertaken to provide information on two separate issues: a particular consultation strategy, and a specific procedure for teaching consonant sounds.

The consultation strategy consisted of identifying a problem in the classroom, selecting a procedure to overcome the problem, and training

teachers to use the procedure by discussing it and demonstrating, both live and with a videotape model.

This strategy worked well. The teachers were responsive to adopting a preplanned teaching procedure to meet a specific need. They were able to carry it out well with very brief training, and collected data to evaluate the procedure. Their desire to repeat the procedure with other students suggests they thought it was of value.

The procedure itself was reasonably successful. In Experiment 1, the older children in the study knew as many sounds as their nonstudy peers at the end of training and at follow-up. The younger group knew fewer sounds than their nonstudy peers, but did know about two-thirds of the sounds on posttest and on follow-up some four months later. In Experiment 2, the students knew none of the sounds on the pretest, but knew about three-fourths of them on the posttest. On the follow-up test, they knew about half of sounds, despite minimal opportunity to apply them subsequent to training.

The total teaching time involved was about 10 hours per group, or an average of less than one and one-half hours per student. Doubtless there are other approaches to teaching consonant sounds which are as effective, if not more so, but the particular one used here is economical of time and easy to implement.

The general consultation procedure used here will most likely be applicable in other similar situations -- to train teachers to use a specific teaching procedure which is fairly straightforward.